

# FOREST HEALTH ALERT

From the Missouri Department of Conservation

## Shortleaf Pine Mortality



**Tree species affected:** Shortleaf pine (*Pinus echinata*)

**Concerns:** Isolated pockets of dying shortleaf pine. Pockets range from a few individuals to several dozen trees. Foliage starts fading and entire tree crowns turn reddish brown in a few weeks. Fading trees usually appear in late summer. Often no evidence of bark beetle attacks can be seen on lower trunks.

**Description:** Pockets of shortleaf pine mortality are frequently caused by *Ips* bark beetle attacks. Three species of *Ips* are common in shortleaf pine. They often differ in the part of the tree they attack. The Small Southern Pine Engraver (*Ips avulsus*) attacks branches and the upper bole. The Eastern Five-Spined Engraver (*Ips grandicollis*) prefers the mid-bole, while the Coarsewriting Engraver (*Ips calligraphus*) is often found in the lower half of the bole. One or more species may be found in a single tree.

*Ips* adults tunnel in the phloem just under the bark, where they lay eggs. Eggs hatch into larvae, which mature into a new generation of adults. Several generations develop within a pine stand in a single year.

*Ips* beetles carry spores of a bluestain fungus that infects beetle-attacked pines. Fungal colonies grow into the outer sapwood, stopping upward water flow and causing needles to wilt and die. Foliage can change from green to reddish brown in 2 to 4 weeks during the heat of summer. Most *Ips* beetles have left the tree by the time needles are reddish-brown. Trees with active *Ips* infestations will have either green or fading foliage. During cool or moist weather, a tree may still be green when beetles depart.

**Symptoms & Signs:** Signs of bark beetle attacks are buck-shot sized exit holes on the bark, small white to red-brown pitch tubes, and galleries (tunnels) under the bark. Main galleries created by *Ips* parent beetles are either Y- or



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**Shortleaf pine mortality during the summer of attack (top) and one year after attack (bottom).**



**Pitch tubes on pine bark from attack by *Ips*.**



Questions? Contact your local forester with the Missouri Department of Conservation.

Find contact information for your county and more at [mdc.mo.gov](http://mdc.mo.gov).

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H-shaped (fivespine and sixspined *Ips*), or mostly straight with the grain (fourspined *Ips*). Larval galleries extend laterally from parent galleries. *Ips* adults are tiny and have a “scooped-out” cavity on the hind end. Depending on the species, beetles range from 2-6 mm in length. While uncommon in Missouri, the southern pine beetle (*Dendroctonus frontalis*) has S-shaped galleries, a rounded posterior, and is 2-3 mm long.

**Causes of Infestations:** *Ips* bark beetle infestations can occur where logging slash or stressed, dying pines provide host material for breeding. Weather events such as drought or windstorms can trigger *Ips* infestations.

**Other Possible Damage Agents:** Large (over 25 mm), reddish-brown pitch tubes may be found on the lower 2 meters of stressed or *Ips*-infested pines. These usually indicate the presence of black turpentine beetles. Their impact on trees is usually minor compared to that of *Ips* beetles.

*Heterobasidion annosum* root disease is sometimes associated with *Ips* infestations. Pockets of the disease have been diagnosed from the Potosi-Fredericktown Ranger District on the Mark Twain National Forest and near Clearwater Lake in Reynolds and Iron Counties. Pine mortality pockets associated with *H. annosum* often have considerable blow-down and can be 20-30 meters in diameter. Mortality is often preceded by thinning and yellowing of the crown. Some trees, however, may simply turn red and die. Infected roots exhibit resin or pitch-soaking and a white stringy root decay. Conks may be present at the base of trees and roots. When present, conks are tan to brownish on the upper surface, white with tiny pores on the lower surface, and are rubbery and tough to tear.

## Recommendations

**Forest stands:** The duration of *Ips* outbreaks in forest stands is often short-lived, lasting only one season. If infested pockets are isolated and widely scattered, the best course of action often is to let the infestation die out on its own. Cutting and removing trees to stop the outbreak may actually accelerate it. Harvesting produces fresh host odors (attractants), logging slash (potential breeding sites), and additional stress or injury to the residual stand.

**Residential trees:** The best strategy for landscape trees is to prevent infestations by increasing tree vigor through good tree care and providing supplemental water during droughts. There is no way to save a tree once it has been successfully colonized. Care should be taken when removing dead trees so that remaining trees are not injured. Insecticide applications on nearby green trees are usually not practical, as the bark must be drenched for the entire length of the bole, even on large trees. Such treatments require professional applicator equipment and are best reserved for high-value trees. Injections and soil drenches of imidacloprid (systemic insecticide, e.g. Bayer Advanced Tree & Shrub Insect Control) are sometimes used for tree borer control, but imidacloprid effectiveness against *Ips* beetles has been disappointing.



***H-shaped adult gallery and lateral tunnels of larvae of the Coarsewriting Engraver (left). Galleries of the Small Southern Pine Engraver (right).***



***Adult Eastern Five-Spined Engraver***